

Lab: Electric Fields and Potentials

INTRODUCTION:

In class we have learned about electric charges and the electrostatic force that charges exert on each other. Another way of looking at this is to recognize that every charge creates an electric field all around it. When a *second* charge is placed in the electric field, it feels a force due to the field— but the field from the original charge is always there, whether or not it is acting on any other charges. In today's lab we'll explore the electric fields around charges and the electric potential produced by charges. The goals are to gain some intuition about the electric fields and potentials surrounding individual charges, and to learn how to add electric fields and potentials from multiple charges.

PART I: ELECTRIC FORCES AND FIELDS

You should have a number of diagrams, printed on paper and transparency foil, of the electric field distribution and the electric potential in the space around a single point charge (either positive or negative). Let's start with the **electric field** vector plots. Describe as many details about the field patterns as you can notice. Describe both the positive and negative charges.

In general, how does the electric field at a point in space relate to the electric force on a charge placed at that point?

In each of the figures below, draw a vector representing the **net force** felt by the **dark-colored charge**. (To indicate the force on an object, draw a force vector arrow coming out of that object.) Draw the vectors to scale, so that longer arrows represent larger forces. Assume all single charges have the same magnitude.

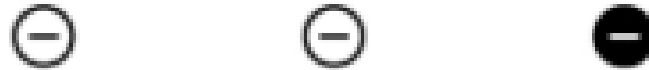
1.



2.



3.



4.



5.



6.



In each of the figures below, draw a vector representing the electric field at the dot. Draw the arrows to scale, so that longer arrows represent stronger fields.

1.



2.



3.



4.



5.



6.

